

Korea Science & Technology

Overview: S&T Organization

The Ministry of Science and Technology (MOST) is responsible for coordinating and implementing national S&T policy, which is set by the National Science & Technology Council, a cabinet-level group chaired by the president, although most meetings are actually chaired by the Minister of Science and Technology acting as the Council's Executive Secretary. The current minister, Dr. Oh Myung, in office only since last December, is also Deputy Prime Minister in charge of all government S&T policy. The ministries of Commerce, Industry, and Energy (MOCIE) and Information and Communication (MIC) are also major S&T players; these three ministries and their associated research institutes control the bulk of Korea's S&T expenditures.

- Korea's gross expenditure on R&D was \$14.4 billion in 2002, which was an increase of about 7.5% from the 2001 figure. Korea continues to rank 2nd in the OECD on gross expenditures on R&D relative to GDP, 8th overall.
- The ROKG estimates that the business sector performs about 71.4% of total R&D, universities and colleges about 12% and the government about 16.6% (FY00).
- In FY03, government S&T outlays amounted to US\$4.7 billion. Overall S&T competitiveness, as ranked by the International Institute for Management Development (IMD) was 10th in 2003.

S&T Issues of Interest to the United States

Korea has recently joined two major multilateral collaborations, the International Partnership for the Hydrogen Economy (IPHE) and the International Thermonuclear Experimental Reactor Project (ITER). Both are long term "big science" projects that, if successful, will have major economic and environmental benefits. In addition, bilateral work in many fields is ongoing under the 1975 framework agreement on S&T cooperation, whose biennial joint commission meeting is scheduled for this fall in Washington.

IPHE: Hydrogen Economy and Fuel Cells – Korea is one of 17 industrialized countries interested in development of the infrastructure that will form the groundwork for eventual large-scale utilization of hydrogen as an energy source, primarily in various applications of fuel cell technologies. Korean government and private sector R&D institutes have made considerable progress towards commercialization of fuel cells; they see IPHE collaborations as a stepping stone towards development of hydrogen production, storage, transportation, and distribution technologies.

ITER – Korea continues to side with Japan and the United States in supporting Rokkasho as the site for the planned reactor complex. Korea's own tokamak fusion research facility

is under construction at the Korea Basic Sciences Institute in Taejeon, in a partnership with the U.S. Department of Energy, and is expected to begin operation next year.

Nanotechnology – The first U.S.-Korea Nano Forum took place in Seoul last October, attended by more than 250 scientists and experts from the two countries. The Forum, co-hosted by MOST and NSF, was an outgrowth of a proposal approved at the fifth U.S.-Korea Joint Committee Meeting on Science and Technology held in October 2002. The Nano Forum provided a venue for exchange of information on the recent status of nanoscale technologies research and development as well as on ideas for mutual cooperation among scientists of both countries in nanotechnology. Through the event, the organizers hoped to help scientists and experts set up professional networks for mutual collaboration and deepen understanding of the institutions, practices, and policy environments of the two nations. The aim was to lay the groundwork for establishing a collaborative environment for high-level U.S.-ROK cooperation in the field.

In November 2001, the Korean government selected nanotechnology as one of its top ten future technologies and unveiled a National Nanotechnology Development Basic Plan with the aim of catching up with more advanced countries such as the United States, Japan, and the EU. According to the plan, the government would place top priority on initiating national R&D programs and constructing infrastructures such as the National Nanofabrication Center, Application-specific Nanofab Centers, and Nano Clusters to accommodate private R&D centers and their manufacturing facilities in the long run. The National Nanofab Center is now under construction within the campus of the Korea Advanced Institute of Science and Technology (KAIST); the other two projects are still on the drawing table. Currently, Korean research activities are focused on such selected National R&D Programs as tera-level nanodevices, nano-mechatronics, and intelligent microsystems including endoscopic microcapsules and wrist-type micro personal digital assistants (PDA).

Ongoing S&T collaboration - Bilateral cooperation in environmental and S&T areas has also remained a strong element of the U.S.-ROK relationship. Under the Joint Working Group on Climate Change Research, for example, 13 research projects or programs are either on-going or in planning stages, involving EPA, NOAA, and DOE on the U.S. side and three Korean ministries and their technical agencies. One of these, an EPA-Ministry of Environment project on air quality monitoring in the Seoul metropolitan area, provided the necessary scientific base for the landmark Special Act on Air Quality in the Seoul Metropolitan Region, passed by the National Assembly in December, 2003.

Joint programs in science and technology come under the umbrella U.S.-ROK S&T Cooperation Agreement, first signed in 1975. Currently, government-to-government collaborations under this agreement are underway in the following areas: Science (9), Energy and Climate (8), Aerospace and Defense (3), Metrology and Standards (2), and Agriculture, Biotechnology, and Health (11). In addition, DOE has a range of collaborative projects with Korean counterpart agencies and laboratories in nuclear science and engineering fields, and several NIH institutes are conducting biomedical research with Korean partners in five fields including stem cell research.

FY04 Science R&D Budget Growth Outpaces National Budget, Reaching 4.9% of the Total

The scientific research and development portions of the Korean national budget are approved by the Ministry of Planning and Budget and the Cabinet and submitted to the National Assembly for enactment. The FY04 national budget, the first prepared by the Roh administration, continues the R&D funding policies of its predecessors and focuses on specific technology areas government planners believe will give Korea a competitive edge, especially in the face of rapidly growing Chinese presence in sectors that have fueled Korea's growth over the past quarter-century, such as consumer electronics. Prominent on Korea's list for increased government investment are biotechnology, information technology, nanotechnology, and space technology. The emphasis continues to be on R&D in relatively near-market technologies.

Overview of 2004 Government R&D Budget

The 2004 R&D budget request increased by 8% over 2003 to \$5.05 billion, representing 4.9% of the total FY04 budget, up from 4.8% last year. Given the proposed overall budget increase of 2.1%, the 8% hike in the R&D sector reflects President Roh's firm commitment to funding increased investment in the government's selected national R&D programs and future economic growth engine technologies. The previous Kim Dae-jung administration had set 5% of the budget as its target for national R&D; in his campaign last year, candidate Roh had proposed a target of 7% to 8%.

The centerpieces of the administration's R&D proposal are the group of ten high-technology sectors selected recently as the nation's "Future Economic Growth Engines" and the 21st Century Frontier R&D program, ongoing since 1999, composed of 22 project areas. The budget allocates an increase of 69.3% for the selected 10 future economic growth engines to \$431.4 million, while the 21st Century Frontier R&D Program receives a 28% boost to \$170.8 million.

Other major R&D outlays include the nation's space technology R&D program, with a 26% rise from 2003 to \$12.5 million, the nano/biotechnology program, a 4.8% hike to \$5.4 million, and nuclear technology development, a 43% boost to \$3.1 million. (Note: current projects under the nation's long-term (1997-2006) nuclear R&D program are funded from a separate account, the "Nuclear Technology Development Fund," which is derived from a levy on sales of nuclear generated electrical power.)

The 2004 budget continues the important R&D trends established by the Kim Dae-jung administration. The R&D budget provides \$2.17 billion for applied research, an increase of 4.8%. This includes funding for specific R&D programs (\$52.3 million), industrial technology innovation (\$97.1 million), research in health and environment (\$26.6 million), and other research projects (\$41.4 million). It boosts funding for university-based basic research to by 12.4% \$935.5 million.

U.S. Embassy Seoul
February 25, 2004

Basic research now constitutes more than 20% of the total government R&D budget. The budget contains \$1.78 billion, a 9.4% increase in funding, for some 27 S&T-related government research institutes (GRIs) and a number of national research labs (NRLs). The FY04 outlay also includes \$152.7 million in funding for the nation's R&D infrastructure build-up and various S&T promotion projects for the local provincial governments. (Note: Traditionally, the Korean government's R&D spending accounts for about 28% of nationwide R&D expenditure. According to latest data released by the Ministry of Science and Technology, Korea's total R&D expenditure rose from \$5.67 billion (1.92% of its GDP) in 1991 to \$12.4 billion (2.68% of its GDP) in 2000.)

U.S. Embassy Seoul
February 25, 2004

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